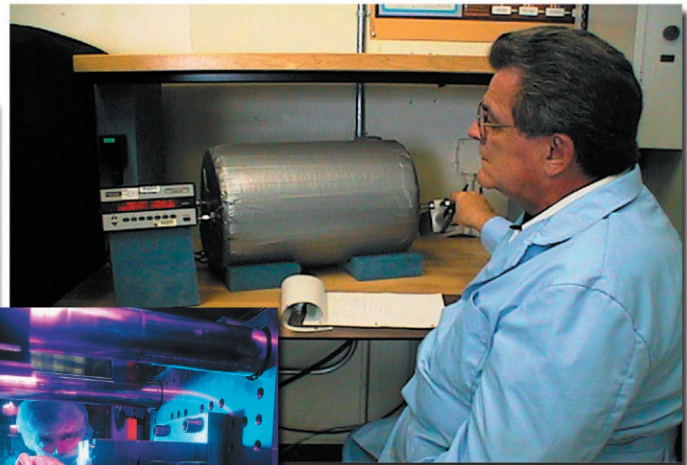
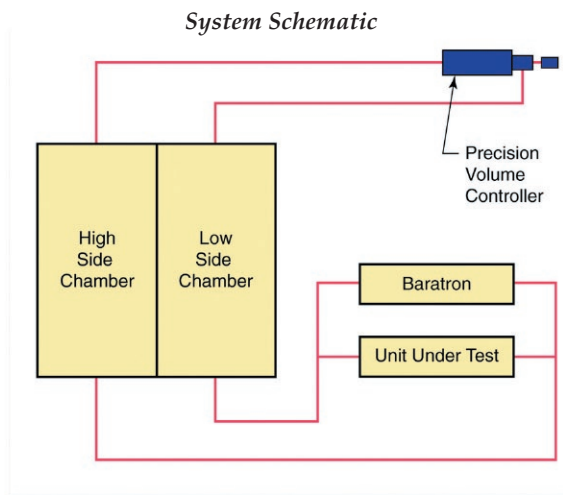
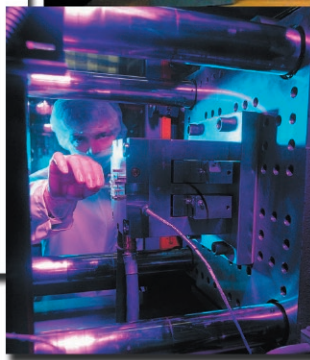


Low-Differential Pressure Generator

The National Aeronautics and Space Administration (NASA) seeks to transfer the NASA-developed Low-Differential Pressure Generator technology to private industry for use in commercial applications. This system was developed at the John F. Kennedy Space Center (KSC) to provide a reliable, portable method for testing low-differential pressure transducers under many laboratory conditions. The transducers are used in many clean rooms at KSC to verify that the rooms are pressurized relative to nonclean areas and the outdoors. The system is currently being used to perform precision testing on low-differential pressure transducers in the Space Station Processing Facility and other spacecraft processing clean rooms. The low-differential pressure generator is rugged, inexpensive, portable, and controllable to 0.00025 inch of water gauge across a span from 0.0 to 0.3 inch of water.



Using the Low-Differential Pressure Generator To Calibrate a Transducer



Potential Commercial Uses

- Manufacturers of low delta P transducers
- Calibration laboratories
- Pharmaceutical/medical industries with clean room operations
- Electric power companies — internal energy management systems
- Heating and air conditioning manufacturers

Benefits

- Precision — controllable to 0.00025 inch of water gauge across a span from 0.0 to 0.3 inch of water
- Portability — can be used in the laboratory or in the field under various conditions
- Ease of operation — a technician, with minimal training, can easily operate this system
- Low cost — one-third the cost of most dead-weight testers



The Technology

The Low-Differential Pressure Generator works by varying the volume of two equal-sized, closed chambers with a common steel wall. This two-compartment tank is insulated to lessen the temperature effects that the environment has on the entrapped gas. Small tubes connect each individual compartment to a precision volume controller (see System Schematic). The displacement of the volume controller causes the entrapped gas in one chamber to increase in pressure while the entrapped gas in the other chamber decreases in pressure. The temperature variations that are a result of the change in pressure (increased temperature on the increasing pressure side and decreased temperature on the decreasing pressure side) are reduced almost at the speed of sound through the common steel bulkhead. This allows precise pressure control without the long waiting periods to allow the temperature effects to dissipate.

Small tubing is used to connect a transfer standard (capacitance manometer) and a test article to the two chambers. The operator adjusts the volume controller until the transfer standard reads the desired differential pressure and then records the readings from the standard and the test article.

Manual adjustments (due to very minor changes in temperature) can be made during testing. In fact, the prototype system has been manually held to a cardinal reading ± 0.0005 inch of water. Tests using this system have shown that the pressure system gave a repeatable stimulus within 0.3 percent full scale of a 0.1 inch of water transducer.

This system can give both positive (rising) differential pressure and negative (decreasing) differential pressure.

Options for Commercialization

NASA seeks qualified companies to commercialize the Low-Differential Pressure Generator. This and other technologies are made available by the KSC Technology Commercialization Office through a variety of licensing and partnering agreements. These include patent and copyright licenses, cooperative agreements, and reimbursable and nonreimbursable Space Act Agreements.

Contact

If your company is interested in the Low-Differential Pressure Generator technology or if you desire additional information, please reference Case Number KSC-11804 and contact:

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Commercialization Checklist

- Patent pending
- ✓ U.S. Patent No. 5,693,871
- Copyrighted
- ✓ Available for licensing
- Available for no-cost transfer
- Seeking industry partner for further codevelopment

KSC-11804/TOP10-19/01-03/2.3